

COPY

☒ Copenhagen:

HØIBERG A/S
 St. Kongensgade 59 A
 DK-1264 Copenhagen K
 Denmark

☐ Aarhus:

HØIBERG A/S
 Forskerpark Aarhus
 Gustav Wieds Vej 10 C
 DK-8000 Aarhus C
 Denmark

European Patent Office
 P.B. 5818
 Patentlaan 2
 2280 HV Rijswijk
 Netherlands

To the International Preliminary Examining Authority

Phone: +45 3332 0337
 Fax: +45 3332 0384

24 January 2005

To telefax No. 0031 70 340 3016
 Confirmation by mail

hoiberg@hoiberg.com
 www.hoiberg.com

Vat No: dk 21490601

PCT Application No. PCT/EP2004/050355

Applicants: Danmarks JordbrugsForskning and Den Kongelige Veterinær- og Landbohøjskole

Title: Methodologies for improving the quality of meat, health status of animals and impact on environment.

Our ref.: P738PC00 – MNN/stc

Dear Sirs

Enclosed please find a demand for preliminary examination in respect of the above PCT application. This letter further includes a response to the written opinion dated 25 August 2004.

The handling fee and examination fee of €1659 as specified in the fee calculation sheet should be drawn from our deposit account No. 28030052.

The applicant respectfully requests that the Examiner acknowledge novelty and inventive step of the amended claims enclosed herein. In case the Examiner intends to issue a preliminary examination report not acknowledging novelty and inventive step of the claimed invention, the applicant requests either

- a telephone interview (Rule 66.6 PCT) or
- a second written opinion

Enclosed please find an amended set of claims.

Amendments to the claims

The method claims have been amended to use claims.

In amended claim 1 it is specified from which fractions the processed chicory product is made up; by which processes the processed chicory product can be produced as well as the factors influenced by the use of this processed chicory product.

In amended claim 43 it is also specified from which fractions the processed chicory product is made up and by which processes the processed chicory product can be produced.

In amended claim 44 it is specified from which fractions the processed chicory product is made up.

Basis for the amendments

Claim 1 is based on original claim 82, 1, 16, 18, 19, 20, 23, 67, 25, 63, 30, 64, 35, 42, 53 and 65 as well as page 24 line 31; page 28 lines 7-8 and page 11 lines 12-13 of the description.

Amended claim 2 is based on original claim 2.

Amended claim 3 is based on original claim 3.

Amended claim 4 is based on original claim 4.

Amended claim 5 is based on original claim 5.

Amended claim 6 is based on original claim 6.

Amended claim 7 is based on original claim 7.

Amended claim 8 is based on original claim 8.

Amended claim 9 is based on original claim 9.

Amended claim 10 is based on original claim 10.

Amended claim 11 is based on original claim 11.

Amended claim 12 is based on original claim 12.

Amended claim 13 is based on original claim 13.

Amended claim 14 is based on original claim 14.

Amended claim 15 is based on original claim 15.

Amended claim 16 is based on original claim 16.

Amended claim 17 is based on original claim 17.

Amended claim 18 is based on original claim 21.

Amended claim 19 is based on original claim 24.

Amended claim 20 is based on original claim 26.

Amended claim 21 is based on original claim 27.

Amended claim 22 is based on original claim 28.

Amended claim 23 is based on original claim 31.

Amended claim 24 is based on original claim 32.

Amended claim 25 is based on original claim 35.

Amended claim 26 is based on original claim 36.

Amended claim 27 is based on original claim 37.

Amended claim 28 is based on original claim 38.

Amended claim 29 is based on original claim 39.

Amended claim 30 is based on original claim 40.

Amended claim 31 is based on original claim 43.

Amended claim 32 is based on original claim 44.

Amended claim 33 is based on original claim 47.

Amended claim 34 is based on original claim 48.

Amended claim 35 is based on original claim 49.

Amended claim 36 is based on original claim 50.

Amended claim 37 is based on original claim 51.

Amended claim 38 is based on original claim 54.

Amended claim 39 is based on original claim 55.

Amended claim 40 is based on original claim 56.

Amended claim 41 is based on original claim 57.

Amended claim 42 is based on original claim 58.

Amended claim 43 is based on original claim 66.

Amended claim 44 is based on original claim 69.

Amended claim 45 is based on original claim 70.

Amended claim 46 is based on original claim 71.

Amended claim 47 is based on original claim 72.

Amended claim 48 is based on original claim 18, 19, 20, 23 and 74, and page 24 line 31.

Amended claim 49 is based on original claim 60.

Amended claim 50 is based on original claim 61.

Amended claim 51 is based on original claim 76.

Novelty and inventive step

D1 (FØJO project application PROSQUAL) describes a project wherein it is to be tested whether Chicory roots fed to pigs have a positive affect on meat and eating quality.

The document D1 does not describe that the animals are fed with processed chicory products as described in amended claim 1. Thus amended claim 1 is novel in respect of D1.

The person skilled in the art could not expect from the information of D1 concerning feeding the animals with fresh chicory roots, that the processed chicory products of amended claim 1 would have the influences on the animals as indicated in amended claim 1. Rather the skilled person would expect that the compounds of the chicory plants would be reduced or decomposed during the processing.

Thus the present invention involves an inventive step in respect of D1.

D2 (Rideout et al.) describes the influence of a chicory inulin extract when fed to Yorkshire barrows. The inulin extract is fed to the animals for 14 days, and does not show any positive effect in respect of reducing nitrogen-related odor and environmental pollution, although the inulin extract may result in reduced odourous emission associated with skatole.

The chicory inulin extract of D2 is different from the chicory product of the present invention. In D2 only inulin from the chicory is used as dietary supplement, whereas in the present invention it is important that also secondary metabolites are present in the processed chicory product.

As the inulin extract of D2 does not contain secondary metabolites, the present invention using processed chicory product comprising inulin and seconarcy metabolites is novel in respect of D2.

The feeding time in D2 is 14 days, whereas the feeding time in the present is less than this as indicated in amended claim 1. Thus an inventive step is obtained in respect of the present invention.

D3 (Hoskin et al.) describes red deers grassing on chicory and other forages. D3 does not describe the use of processed chicory product, thus the present invention is novel in respect of D3.

From the information obtained in D3 the person skilled in the art could not know that processed chicory products when fed to animals would have a positive effect on the meat of animals and/or malodour in the environment and/or infections of the gastrointestinal tract. Hereby the present invention involves an inventive step.

D4 (Choi et al.) describes goats fed with chicory as a roughage source.

The document D4 does not describe the use of processed chicory product, thus the present invention is novel in respect of D4.

From the information obtained in D4 the person skilled in the art could not know that processed chicory products when fed to animals would have a positive effect on the meat of animals and/or malodour in the environment and/or infections of the gastrointestinal tract. Hereby the present invention involves an inventive step.

D5 (Hopkins et al.) describes lambs grazed on chicory for 8 weeks prior to slaughtering.

The document D5 does not describe the use of processed chicory product, thus the present invention is novel in respect of D5.

From the information obtained in D5 the person skilled in the art could not know that processed chicory products when fed to animals would have a positive effect on the meat of animals and/or malodour in the environment and/or infections of the gastrointestinal tract. Hereby the present invention involves an inventive step.

D6 (Knarreborg et al.) describes the use of sugar-beet pulp as a supplement to the dietary fed to male pigs.

The document D6 does not describe the use of processed chicory product as in amended claim 1, thus the present invention is novel in respect of D6.

The person skilled in the art is not taught by D6 that a processed chicory product comprises inulin and secondary metabolites, nor is he taught that such a product can be used to feed animals and hereby obtain a positive effect on the meat of animals and/or malodour in the environment and/or infections of the gastrointestinal tract. Hereby the present invention involves an inventive step.

We hereby respectfully request that novelty and inventive step should be acknowledged in respect of the present invention.

Yours sincerely
HØIBERG A/S



Bart van den Hazel
On behalf of Malene Nielsen

Demand under article 31 PCT
Fee calculation sheet
Amended set of claims
Form 1037

IPEA/EP

CHAPTER II

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of
international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only

Form PCT/IPEA/401 (first sheet) (January 2004)

See Notes to the demand form

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)*HØIBERG A/S
St. Kongensgade 59A
DK-1264 Copenhagen K
Denmark

Telephone No.

+45 33320337

Facsimile No.

+45 33320384

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☒ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☒ as amended under Article 34the drawings ☒ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of the applicable time limit under Rule 69.1(d).4. ☐ The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54bis.1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:		For International Preliminary Examining Authority use only	
		received	not received
1. translation of international application	: sheets	<input type="checkbox"/>	<input type="checkbox"/>
2. amendments under Article 34	: 8 sheets	<input type="checkbox"/>	<input type="checkbox"/>
3. copy (or, where required, translation) of amendments under Article 19	: sheets	<input type="checkbox"/>	<input type="checkbox"/>
4. copy (or, where required, translation) of statement under Article 19	: sheets	<input type="checkbox"/>	<input type="checkbox"/>
5. letter	: 5 sheets	<input type="checkbox"/>	<input type="checkbox"/>
6. other (specify)	: sheets	<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|--|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 5. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> original separate power of attorney | 6. <input type="checkbox"/> sequence listing in computer readable form |
| 3. <input type="checkbox"/> original general power of attorney | 7. <input type="checkbox"/> tables in computer readable form related to a sequence listing |
| 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 8. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

Copenhagen, 24 January 2005


 Bart van den Hazel, HØIBERG A/S

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:	
2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):	
3. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply. <input type="checkbox"/> The applicant has been informed accordingly.	6. <input type="checkbox"/> The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54bis.1(a) and item 7 or 8, below, does not apply.
4. <input type="checkbox"/> The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.	7. <input type="checkbox"/> The date of receipt of the demand is WITHIN the time limit under Rule 54bis.1(a) as extended by virtue of Rule 80.5.
5. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.	8. <input type="checkbox"/> Although the date of receipt of the demand is after the expiration of the time limit under Rule 54bis.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

Claims

1. Use of a processed chicory product comprising inulin and
 - one or more low molecular sugars and/or
 - one or more secondary metabolites,
 feeding an animal said processed chicory product being
 - i. a silage product and/or
 - ii. a fermented product and/or
 - iii. a heated product and/or
 - iv. a dried product and/or
 - v. an extract,
 at least one day prior to slaughtering said animal,
 for the production of a product for
 - a) reducing taint in said animal and/or
 - b) reducing the skatole content in said animal and/or
 - c) reducing the androstenone content in meat and/or fat and/or blood of said animal and/or
 - d) improving the sensory characteristics of meat of said animal and/or
 - e) reducing malodour in the environment around said animal and/or
 - f) reducing the amount of infections of the gastrointestinal tract of said animal.

2. The use according to claim 1, wherein the processed chicory product is fed to the animal for at least two days, for example 3 days, such as at least one week, for example at least 1.5 weeks, such as at least 2 weeks, preferably at least 3 weeks, such as at least 4 weeks, for example at least 5 weeks, such as at least 6 weeks, for example at least 7 weeks, such as at least 8 weeks, for example at least 9 weeks, such as at least 10 weeks, for example at least 15 weeks, such as at least 20 weeks.

3. The use according to claim 1-2, wherein the processed chicory product is fed to the animal substantially until slaughter.

4. The use according to any of the preceding claims, wherein the processed chicory product is fed to the animal daily.

5. The use according to any of the preceding claims, wherein the chicory root product is fed to the animal at least one time a day such as several times daily, such as 2 times, 3 times, 4 times, 5 times, or more than 5 times.
5
6. The use according to any of the preceding claims, wherein the processed chicory product comprises a at least 2.5 % on a daily energy basis of the ration of the animal.
7. The use according to claim 6, wherein the chicory root product part of the ration of the animal is at least 5 % on a daily energy basis.
10
8. The use according to claim 6, wherein the chicory root part comprises at least 10 % of the ration, more preferably at least 15%, more preferably at least 20%, more preferably at least 25%, more preferably at least 30 %, for example at least 35%, such as at least 40%, for example at least 50%, such as at least 60%, for example at least 75%, such as at least 90%, for example substantially 100%.
15
9. The use according to any of the preceding claims, wherein the animal is a ruminant, such as cow, sheep, goat, buffalo.
20
10. The use according to any of the preceding claims 1 to 6, wherein the animal is a monogastric species, such as horse, pig, poultry, dog, and cat.
25
11. The use according to claim 10, wherein the monogastric species is a pig.
12. The use according to claim 11, wherein the pig is a male pig.
13. The use according to claim 12, wherein the pig is an entire male pig.
30
14. The use according to claim 11-13, wherein the animal is a pig having a weight from 25 to 300 kg, preferably as from 55 to 160 kg.

15. The use according to any of the preceding claims, wherein the species of Chicory is *Cichorium intybus* L.
- 5 16. The use according to any of the preceding claims, wherein the processed chicory product comprises chicory roots which contain at least 5% inulin, more preferably at least 10% inulin, more preferably at least 15 % inulin, more preferably at least 20 % inulin, such as at least 25% inulin, for example at least 30 % inulin.
- 10 17. The use according to any of the preceding claims, wherein the processed chicory product comprises chicory roots which contain at least 5% FOS, more preferably at least 10% FOS, more preferably at least 15 % FOS, more preferably at least 20 % FOS, such as at least 25% FOS, for example at least 30 % FOS.
- 15 18. The use according to any of the preceding claims, wherein the processed chicory root product is a disintegrated product, such as a powder, flakes, pulp, slices, flour, pellets.
- 20 19. The use according to any of the preceding claims, wherein the processed chicory product comprises an inulin fraction and a low molecular weight fraction comprising coumarins and/or sesquiterpenes.
- 25 20. The use according to any of the preceding claims, wherein the skatole content of blood is reduced by at least 25%, more preferably at least 40%, more preferably at least 50%, more preferably at least 75%, more preferably at least 80%, more preferably at least 90%, more preferably at least 95%, more preferably at least 98%, more preferably to substantially 0.
- 30 21. The use according to claim 21, wherein the skatole content of blood and/or backfat is reduced to below the human sensory threshold.
- 35 22. The use according to claim 1-19, wherein the skatole content of backfat is reduced by at least 25%, more preferably at least 40%, more preferably at least 50%, more preferably at least 75%, more preferably at least 80%, more

preferably at least 90%, more preferably at least 95%, more preferably at least 98%, more preferably to substantially 0.

- 5 23. The use according to claim 1-19, wherein the androstenone content is reduced by at least 10%, more preferably at least 25%, more preferably at least 40%, more preferably at least 50%, more preferably at least 75%, more preferably at least 80%, more preferably at least 90%, more preferably at least 95%, more preferably at least 98%.
- 10 24. The use according to claim 23, wherein the androstenone content in meat and/or fat is reduced to below the human sensory threshold.
- 15 25. The use according to claim 1-19, wherein improving the sensory characteristics meat comprising improving the sensory characteristics odour, flavour, taste and/or aftertaste of meat from a human sensory perspective.
- 20 26. The use according to claim 25, wherein the improvement of sensory characteristics is a reduction of boar taint comprising reducing Piggy/Animal-odour and/or Piggy/Animal-flavour to an acceptable level from a human sensory perspective.
- 25 27. The use according to claim 25, wherein the improvement of sensory characteristics is a reduction of boar taint comprising increasing acceptable sensory characteristics selected from the group of Fresh cooked pork meat like-odour and flavour, Sweet meaty-odour, Sweet-taste, Umami-taste, Meat/Gamey-odour and flavour, Herby-flavour, Spicy-flavour and Heat/spicy aftertaste, Nutty-odour, Metallic-flavour, Meat/Gamey-flavour, Herby-flavour, Spicy-flavour, Lactic/fresh sour-flavour.
- 30 28. The use according to claim 25, wherein the improvement of sensory characteristics is a reduction of lipid-oxidation comprising increasing acceptable sensory characteristics selected from the group of Cardboard-odour and flavour and Linseed oil-odour.

- 5 29. The use according to claim 25, wherein the improvement of sensory characteristics comprises reduction of sensory characteristics selected from the group of: Piggy/Animaly-odour and flavour, Manure/Stable-odour and flavour, Livestock/Barney-flavour, Cooked liver/Organy-flavour, Musty-odour, Urine-odour, Sweat-odour, Flat Bitter-aftertaste, White pepper-flavour,, Chemical/medicinal-aftertaste, Unacceptability.
- 10 30. The use according to claim 29, wherein the improvement of sensory characteristics comprises improving sensory characteristics such that Hardness-texture is decreased and Tenderness and Juiciness texture are increased and are involved in improving acceptability
- 15 31. The use according to claim 1-19, wherein reducing of malodour in the environment is caused by a relative reduction in skatole and/or p-cresole and/or indole in the gastrointestinal tract of said animal.
- 20 32. The use according to claim 31, wherein reducing of malouour in the environment is caused by a relative increase in the amount of 2-pentanon and/or ethylbutyrate and/or propylpropionate and/or propylbutyrate and/or butanoic acid 2-methyl-ethylester in the gastrointestinal tract of said animal.
- 25 33. The use according to claim 32, wherein the monogastric animal is a furred animal, such as mink, fox, mouse, cat, muskrat, rabbit, hare, wolf, dog.
- 30 34. The use according to claim 32, wherein the monogastric animal is an animal used for meat, such as pig, poultry, rabbit, hare, more preferably wherein the monogastric animal is a pig.
35. The use according to any of the preceding claims 31 to 34, wherein the malodour is stable malodour and the animal is kept in a stable.
36. The use according to claim 35, wherein the animal is kept in the stable for at least 8 hours a day.

37. The use according to any of the preceding claims 32 to 36, wherein the malodour is manure malodour and the manure originates from animals fed with the chicory root product.

5 38. The use according to claim 1-19, wherein the infections are infections with parasites.

39. The use according to claim 38, wherein the parasites are worms.

10 40. The use according to claim 38, wherein the reduction is a reduction of the number of eggs in the animal faeces.

41. The use according to claim 38, wherein the infections are microbiological infections selected from Coli, Salmonella, Campylobacter and Yersinia.

15 42. The use according to claim 41, wherein the infections are worms selected from *Ascaris suum*, *Oesophagostomum dentatum*, *Oesophagostomum quadrispinulatum*, *Oesophagostomum brevicaudum*, *Oesophagostomum granatensis*, *Oesophagostomum georgianum*, *Hyostrogylus rubidus*,
20 *Trichuris suis*, and *Strongyloides ransomi* and *Trichinella* spp.

43. A method for preparing a processed chicory food product comprising inulin and

- one or more low molecular sugars and/or
- 25 • one or more secondary metabolites,

said method comprising the steps of

- providing chicory roots,
- processing said chicory roots by
 - a) ensiling and/or
 - 30 b) fermentation and/or
 - c) heating and/or
 - d) drying and/or
 - e) extracting
- obtaining the processed chicory product.

35

44. A processed chicory product comprising components from chicory roots, where said components comprises at least inulin, and

- one or more low molecular sugars and/or
- one or more secondary metabolites.

45. The processed chicory product according to claim 46, wherein said low molecular sugars are selected from the group of glucose, fructose, sucrose, maltose, maltotriose, maltotetraose, fructan (tri to octasaccharides).

46. The processed chicory product according to claim 44 to 45, wherein said secondary metabolites are selected from the group of terpenes, phytosterols, polyamines, coumarins and flavonoids.

47. The processed chicory product according to claim 44 to 46, wherein said secondary metabolites are selected from the group of Sesquiterpene lactones such as 8-Deoxylactucin, crepidiaside, lactucin, lactupicrin, crepidraside, 11- β -13-dihydrolactucin, picriside, sonchuside A, sonchuside C, cichoriolide A, cichoriosides A, cichorioside B and cichorioside C; Phytosterols such as Sitosterol, stigmasterol, and campersterol; Coumarines such as Esculetin (=aesculetin), esculin (the glucon of esculetin), cichoriin-6'-p-hydroxyphenyl acetate and cichoriin; Flavonoids such as Luteolin 7-glucuronide, quercetin 3-galactoside, quercetin 3-glucuronide, kaempferol 3-glucoside, kaempferol 3-glucuronide, isorhamnetin 3-glucuronide; Anthocyanins such as Cyanidin 3-O- β -(6-o-malonyl)-D-glucopyranoside and four delphinidin derivatives; Caffeic acid derivatives such as Caffeic acid, chicoric acid, and chlorogenic acid; Polyamines (biogenic amines) such as Putrescine, spermidine, spermine.

48.

The processed chicory product according to claim 44 to 47, wherein said processed chicory product comprises a chicory product that is:

- a silage product and/or
- a fermented product and/or
- a heated product and/or

- a dried product and/or
- an extract.

5 49. Use of a processed chicory product according to claim 44 to 48 as a feed product for "grown up" (> 7 weeks) pigs.

50. Use of a processed chicory product according to claim 44 to 48 for preparing a feed product for "grown up" pigs.

10 51. A feed product comprising a processed chicory product according to claim 44 to 48.